

Translation

PATENT COOPERATION TREATY

Rec'd PCT/PTO 07 DEC 2004  
PCT

10/516821

PCT/JP2003/008245



INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 03PCFP860	<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
International application No. PCT/JP2003/008245	International filing date (day/month/year) 27 June 2003 (27.06.2003)	Priority date (day/month/year) 28 June 2002 (28.06.2002)
International Patent Classification (IPC) or national classification and IPC G02F 1/01		
Applicant NEC CORPORATION		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 11 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☒ Certain observations on the international application

Date of submission of the demand 27 June 2003 (27.06.2003)	Date of completion of this report 07 April 2004 (07.04.2004)
Name and mailing address of the IPEA/JP	Authorized officer
Facsimile No.	Telephone No.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/JP2003/008245

## I. Basis of the report

### 1. With regard to the elements of the international application:\*

- ☐ the international application as originally filed
- ☒ the description:  
 pages 1-40, 42, 43, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages 41, filed with the letter of 04 November 2003 (04.11.2003)
- ☒ the claims:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, as amended (together with any statement under Article 19  
 pages \_\_\_\_\_, filed with the demand  
 pages 2, 3, 10, 12-14(04.11.03)4-6, 8, 9, 11, 15-24, 26, filed with the letter of 15 March 2004 (15.03.2004)
- ☒ the drawings:  
 pages 1-19, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
 pages \_\_\_\_\_, as originally filed  
 pages \_\_\_\_\_, filed with the demand  
 pages \_\_\_\_\_, filed with the letter of \_\_\_\_\_

### 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

### 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

### 4. ☒ The amendments have resulted in the cancellation of:

- ☐ the description, pages \_\_\_\_\_
- ☒ the claims, Nos. 1, 7, 25, 27, 28, 29
- ☐ the drawings, sheets/fig \_\_\_\_\_

### 5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).\*\*

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rule 70.16 and 70.17).

\*\* Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.

# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.  
PCT/JP03/08245

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

Novelty (N)	Claims	2-6, 8-10, 12-16, 18, 19, 21-24, 26	YES
	Claims	11, 17, 20	NO
Inventive step (IS)	Claims	2-6, 8-10, 21-24, 26	YES
	Claims	12-16, 18, 19	NO
Industrial applicability (IA)	Claims	2-6, 8-24, 26	YES
	Claims		NO

### 2. Citations and explanations

The subject matter of claims 11, 17, and 20 is not novel on account of document 1.

Document 1 describes utilizing the "connection part" remaining from "incomplete separation" for advantages in mechanical strength. If even one part of an unseparated portion remains, it is found to be "incomplete separation," and what is described in document 1 is not limited to just the case in which the "connection part" is always present continuously in the waveguide direction.

The subject matter of claim 12 does not involve an inventive step on account of document 1.

The shape of the optical waveguide if an etching residue part remains is not found to be a distinctive point.

The subject matter of claim 13 does not involve an inventive step on account of document 1.

In the context of a thermophotometric phase shifter, from the perspective of thermal conductivity, putting a gap between the substrate and a bridge-like optical waveguide or introducing another material with smaller thermal conductivity coefficient, and the fact that a partial connecting part between a bridge-like optical waveguide and the substrate is advantageous in terms of mechanical strength is found to be well-known technical matters in document 1.

The fact that a "support part" is "formed of a material with a smaller thermal conductivity coefficient than the substrate" would be obvious to a person skilled in the art.

The subject matter of claims 14-16 does not involve an inventive step on account of document 1.

Simply forming a support part from "material whose etching rate is greater than that of the substrate" or "material that is the same as the clad layer" does not appear to have a significant effect in relation to the other constituent elements described in the claims as a "thermophotometric phase shifter" and is not found to be a distinctive technical matter.

The subject matter of claim 20 does not involve an inventive step on account of document 1.

Designing the shape of an optical waveguide from the perspective of mechanical strength is not found to be a distinctive point.

The subject matter of claims 2-6, 8-10, 21-24, and 26 is not described in any of the documents cited in the ISR and appears to be non-obvious to a person skilled in the art.

#### Documents:

1. JP, 01-158413, A
2. US, 6031957, A1
3. M. HORINO, et al., JSME International Journal, Ser. C, Vol. 41, No. 4, 1998, pages 978-982
4. A. SUGITA, et al., Trans. IEICE, Vol. E37, No. 1, 1990, pages 105-109

**INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

International application No.

PCT/JP03/08245

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

The correspondence between "support part provided a part extending in the core direction," in claim 11, and "the support part is formed continuously along the entire length of the direction the aforesaid core extends" in claim 17, which cites claim 11, is unclear.